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Application/Control Number: 09/869,133

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Re: proposed changes

CC:

☐ Urgent ☒ For Review ☒ For Comment ☐ For Reply ☐ Per Your Request

Comments:

Mary,

Attached are the proposed changes that I talked to you about earlier. If you have any questions, feel free to call at 703-305-0268.

Thanks,
Michael Feely

Number of pages 6 including this page

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Overview:

The proposed changes are intended to clarify the features of the water-based urethane resin.

Urea bonds:

The current version of the claims include the following limitation, "the ratio of nitrogen in urea bonds to the nitrogen participating in the isocyanate reaction;" however, there is no previous mention of urea bonds present in the urethane resin. Based on the specification (*see the paragraph bridging pages 5 and 6*), urea bonds are introduced to the urethane skeleton at some stage of the urethane resin synthesis. This is also true for the introduction of carboxyl groups to the resin skeleton. Therefore, it is believed that the resin skeleton should be described as one --comprising a bisphenol skeleton, at least one carboxyl group, and urea bonds--. In addition, a broad recitation describing the synthesis of the urethane resin has been inserted: --wherein synthesis of said water-based urethane resin comprises: an isocyanate reaction with a polyol to form a resin skeleton, wherein at least a portion of said polyol has a bisphenol skeleton; introduction of at least one carboxyl group to the resin skeleton; and introduction of urea bonds to the resin skeleton.--

Nitrogen content:

The new language is an attempt to clarify what exactly is meant by, "content of nitrogen participating in an isocyanate reaction during the synthesis of said water-based urethane." Based upon the specification (*see first full paragraph of page 5 and "*1" on page 12*), it appears that this nitrogen content is the nitrogen content of the overall urethane resin, based on only the nitrogen atoms that participated the isocyanate reaction,

i.e. excluding nitrogen introduced by the urea bonds. Hence, the following language has been inserted to clarify the nitrogen content limitation: --wherein the nitrogen content of the water-based urethane is based on nitrogen atoms that participated in the isocyanate reaction--.

Proportion of nitrogen atoms present in urea bonds:

The new language is an attempt to clarify what exactly is meant by, "the ratio of the nitrogen in urea bonds to the nitrogen participating in the isocyanate reaction." Based on the specification (*see paragraph bridging pages 5 and 6, and "*2" on page 12*), a suggested change would be, --wherein the proportion of nitrogen atoms present in urea bonds to nitrogen atoms that participated in the isocyanate reaction is between 10/100 and 90/100--.

1. A water-based metal surface treatment composition for forming a lubricating film with excellent marring resistance comprising:

(a) a water-based urethane resin having:

an average molecular weight of at least 3000 *{original claim}*,

a resin skeleton comprising a bisphenol skeleton, at least one carboxyl group *{original claim}* , and urea bonds *{overcome antecedent basis issue; support in paragraph bridging pages 5 and 6}* , and

a nitrogen content between 2 and 13 wt% *{original claim}* ;

wherein synthesis of said water-based urethane resin comprises *{added to provide clarity regarding the nitrogen content and nitrogen-urea ratio}*;

an isocyanate reaction with a polyol to form a resin skeleton, wherein at least a portion of said polyol has a bisphenol skeleton *{support in first three full paragraphs of page 4, first full paragraph of page 5}* ;

introduction of at least one carboxyl group to the resin skeleton *{support in paragraph bridging pages 4 and 5}* ; and

introduction of urea bonds to the resin skeleton *{support in paragraph bridging pages 5 and 6}* ;

wherein the nitrogen content of the water-based urethane is based on nitrogen atoms that participated in the isocyanate reaction *{slightly reworded from original – support on first full paragraph of page 5, “*1” on page 12}* ; and

wherein the proportion of nitrogen atoms present in urea bonds to nitrogen atoms that participated in the isocyanate reaction is between 10/100 and 90/100 *{slightly reworded from original – support in paragraph bridging pages 5 and 6; “*2” on page 12}* ;

(b) a hardener;

(c) silica; and

(d) a polyolefin wax;

wherein the combined amount of components (a) and (b), as solids with respect to the total solid weight (e), is 50 to 95 wt%, the equivalent ratio of functional groups in component (b) with respect to equivalents of carboxyl groups contained in the resin skeleton of component (a) is 0.10 to 1.00, the solid weight of component (c) with respect to (e) is 3 to 40 wt%, and the solid weight of component (d) with respect to (e) is 2 to 30 wt%.

2. The water-based metal surface treatment composition of claim 1, wherein the nitrogen content of the water-based urethane resin is 5 to 10 wt% *{slight wording change from original}* .

3-6) Change "A water-based metal surface treatment composition" to --The water-based metal surface treatment composition--. *{minor informality}*

7. The water-based metal surface treatment composition of claim 1, wherein the proportion of nitrogen atoms present in urea bonds to nitrogen atoms that participated in the isocyanate reaction is between 40/100 and 80/100 *{slight wording change from original}* .

8-12) Change "A water-based metal surface treatment composition" to --The water-based metal surface treatment composition--. *{minor informality}*

19. A water-based metal surface treatment composition for forming a lubricating film with excellent marring resistance comprising:

(a) a water-based urethane resin having *{same changes found in claim 1}* :

an average molecular weight of at least 3000,

a resin skeleton comprising a bisphenol skeleton, at least one carboxyl group, and urea bonds, and

a nitrogen content between 5 and 10 wt%;

wherein synthesis of said water-based urethane resin comprises:

- an isocyanate reaction with a polyol to form a resin skeleton, wherein at least a portion of said polyol has a bisphenol skeleton;
- introduction of at least one carboxyl group to the resin skeleton; and
- introduction of urea bonds to the resin skeleton;

wherein the nitrogen content of the water-based urethane is based on nitrogen atoms that participated in the isocyanate reaction; and

wherein the proportion of nitrogen atoms present in urea bonds to nitrogen atoms that participated in the isocyanate reaction is between 40/100 and 80/100;

- (b) a hardener comprising at least one type of functional group selected from the group consisting of epoxy groups and isocyanate groups;
- (c) silica having a particle size of 3 to 30 nm; and
- (d) a polyolefin wax having a branched structure, an average particle size of 0.1 to 7.0 μm , and a saponification value of zero to 30;

wherein the combined amount of components (a) and (b), as solids with respect to the total solid weight (e), is 55 to 75 wt%, the equivalent ratio of functional groups in component (b) with respect to equivalents of carboxyl groups contained in the resin skeleton of component (a) is 0.30 to 1.00, the solid weight of component (c) with respect to (e) is 10 to 30 wt%, and the solid weight of component (d) with respect to (e) is 10 to 25 wt%.